

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application:

1. (currently amended): A control device for a hydraulic clutch which is provided in a power train of a vehicle to transmit a drive torque, comprising:
 - an oil pressure supply unit which supplies oil pressure to engage the clutch;
 - a sensor which detects a temperature of the hydraulic fluid supplied to the clutch; and
 - a programmable controller programmed to:
 - count an elapsed time following a release of the clutch; and
 - cause the oil pressure supply unit, when the clutch is engaged from a state of release, to precharge the interior of the clutch in accordance with the counted time to fill the interior of the clutch with hydraulic fluid prior to engaging engage the clutch;
 - determine a precharge pressure based on the temperature of the hydraulic fluid such that the precharge pressure becomes higher as the temperature of the hydraulic fluid decreases;
 - determine a tentative precharge period based on the precharge pressure and the temperature of the hydraulic fluid;
 - calculate a voidage in the interior of the clutch based on the elapsed time and the temperature of the hydraulic fluid;
 - determine a precharge period based on the product of the tentative precharge period and the voidage; and
 - cause the oil pressure supply unit to precharge the interior of the clutch with the precharge pressure for the precharge period.

2. (currently amended): The control device as defined in Claim 1,
wherein the power train comprises a transmission comprising a forward range, a
reverse range, and a neutral range,

wherein the hydraulic clutch comprises a forward clutch which is engaged in the
forward range and released in ranges other than the forward range, and

wherein the controller is further programmed to programmed to:

count a continuous time period of selection of a range other than the forward
range, and

precharge the interior of the forward clutch in accordance with the counted
time.

3. (currently amended): The control device as defined in Claim 2, further
comprising: wherein the device further comprises

a shift lever which selects the forward range, the reverse range, and the neutral range
and range; and

an inhibitor switch which detects a selected range of the shift lever,

wherein the and the controller is further programmed to cause the oil pressure supply
unit to engage the forward clutch when the selected range is shifted to the forward range from
another range.

4. (currently amended): The control device as defined in Claim 1,
wherein the power train comprises a transmission provided with a forward range, a
reverse range, and a neutral range,

wherein the hydraulic clutch comprises a reverse clutch which is engaged in the
reverse range and released in ranges other than the reverse range, and

wherein the controller is further programmed to programmed to:

count a continuous time period of selection of a range other than the reverse
range, and

precharge the interior of the reverse clutch in accordance with the counted
time.

5. (currently amended): The control device as defined in Claim 4, further comprising: wherein the device further comprises

a shift lever which selects the forward range, the reverse range, and the neutral range; and range and

an inhibitor switch which detects a selected range of the shift lever, and lever,

wherein the controller is further programmed to cause the oil pressure supply unit to engage the reverse clutch when the selected range is shifted to the reverse range from another range.

6. (original): The control device as defined in Claim 1, wherein the controller is further programmed to cause the oil pressure supply unit to precharge the interior of the clutch for a longer period as the elapsed time decreases.

7. (currently amended): The control device as defined in Claim 1, wherein the device further comprises a sensor which detects a temperature of the hydraulic fluid supplied to the clutch, and the controller is further programmed to cause the oil pressure supply unit to precharge the interior of the clutch for a longer period as the temperature of the hydraulic fluid decreases.

8. (currently amended): The control device as defined in Claim 1, wherein the power train comprises an internal combustion engine which generates driving torque,

wherein the sensor the control device further comprises a sensor which detects a rotation speed of the engine and engine, and

wherein the controller is further programmed to cause the oil pressure supply unit to precharge the interior of the clutch with a higher precharge pressure as the rotation speed of the engine increases.

9. (cancelled).

10. (cancelled).

11. (currently amended): A control device for a hydraulic clutch which is provided in a power train of a vehicle to transmit a drive torque, comprising:

means for supplying oil pressure to engage the clutch;

means for detecting a temperature of the hydraulic fluid supplied to the clutch;

means for counting an elapsed time following a release of the clutch; and clutch;

means for causing the oil pressure supplying means, when the clutch is engaged from a state of release, to precharge the interior of the clutch in accordance with the counted time to fill the interior of the clutch with hydraulic fluid prior to engaging engage the clutch;

means for determining a precharge pressure based on the temperature of the hydraulic fluid such that the precharge pressure becomes higher as the temperature of the hydraulic fluid decreases;

means for determining a tentative precharge period based on the precharge pressure and the temperature of the hydraulic fluid;

means for calculating a voidage in the interior of the clutch based on the elapsed time and the temperature of the hydraulic fluid;

means for determining a precharge period based on the product of the tentative precharge period and the voidage; and

means for causing the oil pressure supply unit to precharge the interior of the clutch with the precharge pressure for the precharge period.

12. (currently amended): A control method of a hydraulic clutch which is provided in a power train of a vehicle to transmit a drive torque and is engaged by oil pressure, the method comprising:

detecting a temperature of the hydraulic fluid supplied to the clutch;
counting an elapsed time following a release of the clutch; and clutch;
precharging the interior of the clutch in accordance with the counted time to fill the interior of the clutch with hydraulic fluid prior to engaging engage the clutch;
determining a precharge pressure based on the temperature of the hydraulic fluid such that the precharge pressure becomes higher as the temperature of the hydraulic fluid decreases;
determining a tentative precharge period based on the precharge pressure and the temperature of the hydraulic fluid;
calculating a voidage in the interior of the clutch based on the elapsed time and the temperature of the hydraulic fluid;
determining a precharge period based on the product of the tentative precharge period and the voidage; and
causing the oil pressure supply unit to precharge the interior of the clutch with the precharge pressure for the precharge period.

AMENDMENTS TO THE ABSTRACT

Please amend the Abstract as follows:

A hydraulic clutch (12, 13) transmits driving torque in a power train of a vehicle. An oil pressure supply unit (35) which supplies oil pressure for engagement to the clutch (12, 13) and a controller (40) which clutch and a controller controls the unit (35) are provided unit. The controller (40) causes the unit (35) causes the unit, prior to engagement of the clutch (12, 13) clutch, to precharge the interior of the clutch clutch (12, 13) with hydraulic fluid. The controller (40) counts counts an elapsed time since the last release of the clutch (12, 13) and shortens the precharge period as the elapsed time decreases, thereby optimizing the precharge state of the clutch (12, 13) clutch.